Math 318 Discrete Math

Credit Hours: 3
Scheduled hours per week
   Lecture: 3
   Lab: 0
   Other: 0

Catalog Course Description: Topics include: logic and set theory, functions, algorithms, recursion, combinatorics, and graphs.

Pre-requisites: 23 on ACT or Grade of “C” or better in MATH 126 or MATH 125

Co-requisites: None

Course Learning Outcomes:
   A. Demonstrate a basic understanding of the terminology, symbology, and rules of basic proof systems and classical logic.
   B. Demonstrate an understanding of set definitions and symbology. Calculate set union, intersection, difference, and complements. Demonstrate understanding of subsets, ordered pairs, ordered tuples, and Cartesian products.
   C. Demonstrate the ability to discern between functions and relations, to identify one to one and onto functions, to calculate the inverse function using the switch and solve strategy. Form the composition and sum, difference, product, and quotient of functions. Demonstrate an understanding of range, domain and partial functions.
   D. Demonstrate a knowledge of the definition of algorithms, efficiency of algorithms and understand some sorting, searching, and division algorithms.
   E. Demonstrate a basic understanding of sequence and series, recursion, iteration, induction and linear homogenous recurring relations with constant coefficients.
   F. Demonstrate the ability to apply basic counting principals, permutations, combinations and the binomial theorem.
   G. Demonstrate an understanding of graph terminology, to include paths cycles and trees and basic algorithms such as least path.

Topics to be studied:
   Symbolic logic
   Fuzzy Logic
   Set operations
   Cardinality of sets
   Recursively defined sets
   Function definitions
   One to one functions
   Onto functions
   Composition of functions
   Algebra of functions
   Inverse Functions
   Searching and sorting algorithms
Division algorithms
Divisibility properties
Non decimal basis
Big Oh notation
Sequence and Series
Recursion
Iteration and Induction
Linear Homogeneous Recurring Relations with constant coefficients
Fibonacci numbers
Counting principals
Permutations
Combinations
Binomial theorem
Graphs
Graph terminology
Paths
Cycles
Trees

**Relationship of Course to Program or Discipline Learning Outcomes:**
(What program outcomes are being met by this course?
For general education courses, a listing of the general education competencies that are met.)

**Relationship of Course to Mathematics (MATH) Student Learning Outcomes:**

| Demonstrate understanding of the language of mathematics, by their use of symbols, definitions, word phrases, and representations. | x |
| Display proficiency in mathematical computations. | x |
| Implement mathematical techniques to solve applied problems. | x |
| Employ appropriate technology to demonstrate knowledge of mathematical concepts. | x |
| Exhibit mastery of core course competencies. | x |

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<th>Relationship of Course to General Education Learning Outcomes:</th>
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<tr>
<td><strong>Composition and Rhetoric</strong> Students illustrate a fundamental understanding of the best practices of communicating in English and meet the writing standards of their college or program-based communication requirements.</td>
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<td><strong>Science &amp; Technology</strong> Students successfully apply systematic methods of analysis to the natural and physical world, understand scientific knowledge as empirical, and refer to data as a basis for conclusions.</td>
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<td><strong>Mathematics &amp; Quantitative Skills</strong> Students effectively use quantitative techniques and the practical application of numerical, symbolic, or spatial concepts.</td>
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<td><strong>Society, Diversity, &amp; Connections</strong> Students demonstrate understanding of and a logical ability to successfully analyze human behavior, societal and political organization, or communication.</td>
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<td><strong>Human Inquiry &amp; the Past</strong> Students interpret historical events or philosophical perspectives by identifying patterns, applying analytical reasoning, employing methods of critical inquiry, or expanding problem-solving skills.</td>
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<td><strong>The Arts &amp; Creativity</strong> Students successfully articulate and apply methods and principles of critical and creative inquiry to the production or analysis of works of art.</td>
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**Special requirements of the course:** None

**Additional information:** None

**Prepared by:** Thomas Riddle

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